

PATENT ABSTRACTS OF JAPAN

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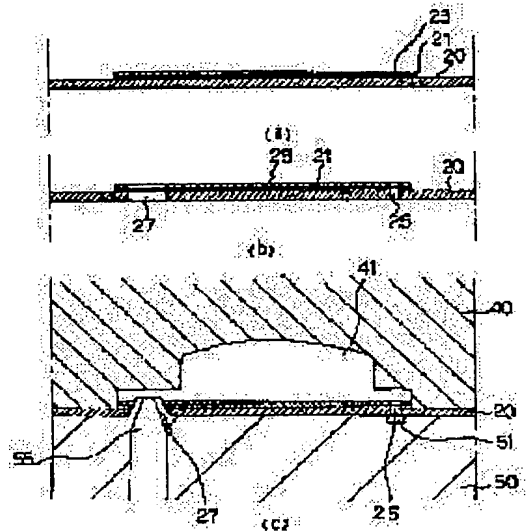
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(54) MANUFACTURE OF KEY TOP PLATE

(57)Abstract:

PURPOSE: To prevent a film sheet from peeling off and simplify a die structure.

CONSTITUTION: This method of manufacturing a key top plate is to manufacture a key top plate with a key top of a molded resin formed on the upper surface of a film sheet 20. There are provided a first die 40 with a cavity 41 of the same shape as that of the upper part of the key top, the film sheet 20 with a through hole 27 opened at a specified opposite position to the cavity 41, and a second die 50 with a pin gate 55 projected toward the cavity 41, which is opposed to the through hole 27. The film sheet 20 is held between the first and the second dies 40, 50, and a molten resin is poured into the cavity 41 in the first die 40 from the pin gate 55 formed in the through hole 27. The first and the second dies 40, 50 are removed after the molten resin is solidified.



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CLAIMS

[Claim(s)]

[Claim 1] The manufacture method of the keytop board which comes to fabricate the keytop which becomes the upper surface of the film board which consists of a resin film which is characterized by providing the following, and which has flexibility from a mould resin The 1st metal mold which has the mold cavity of the shape of the configuration of the upper part of the aforementioned keytop, and isomorphism The film board which prepared the breakthrough in the predetermined position which counters the mold cavity of this 1st metal mold The pin gate which projects toward the inside of the mold cavity of the 1st metal mold of the above in the position which counters the breakthrough of this film board

[Claim 2] The manufacture method of the keytop board which comes to fabricate the keytop of a configuration which consisted of a mould resin, could project the tongue-shaped piece or the flange section for resin pouring on the periphery, and was closed on the upper surface of the film board which consists of a resin film which is characterized by providing the following, and which has flexibility at it The 1st metal mold which has the mold cavity of the shape of the configuration of the upper part of the aforementioned keytop, and isomorphism The film board which prepared the breakthrough in the predetermined position which counters the portion which casts the tongue-shaped piece or the flange section of a mold cavity of this 1st metal mold The pin gate which projects toward the inside of the mold cavity of the 1st metal mold of the above in the position which counters the breakthrough of this film board

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the manufacture method of the keytop board used for a push button switch.

[0002]

[Description of the Prior Art] In order to attain miniaturization and thin shape-ization conventionally, the keytop board which cast the keytop made of a direct mould resin is developed on the film board which consists of a resin film, the desired printing layer is printed to the film board also in it, and the keytop board of the type which it begins to illuminate by the lighting means which has arranged this to the down side is developed.

[0003] Drawing 7 is the important section outline sectional side elevation showing the portion of the keytop of this kind of conventional keytop board. As shown in this drawing, this keytop board 200 casts directly the keytop 211 transparent and transparent on the film board 201 made of a resin which printed the desired printing layer on the upper surface made of a mould resin, and is constituted.

[0004] Fixation between the film board 201 and a keytop 211 is performed by pinching the film board 201 by the flange section 215 prepared in the periphery of a keytop 211, and the fixed part 217 which results in the rear-face side of the film board 201 from the flange section 215 through the breakthrough 205 prepared in the film board 201.

[0005] And if it begins to illuminate this keytop board 200 from the bottom by the lighting means which is not illustrated, the color, the pattern, etc. printed on the film board 201 will begin to be distinctly compared with the front face of a keytop 211. Since it can display without the color, the pattern, etc. printed into this whole portion being barred by what thing since neither a breakthrough 205 nor a fixed part 217 is located in the whole portion of right under except the flange section 215 of a keytop 211 especially in the case of this keytop 211, it is suitable.

[0006] Drawing 8 is the important section outline sectional side elevation showing how to manufacture this kind of keytop board 200. As shown in this drawing, in order to manufacture this keytop board 200 The 1st metal mold 300 which has the mold cavity 301 of the shape of the configuration of the upper part of a keytop 211, and isomorphism, The film board 201 which formed two or more breakthroughs 205 in the predetermined position, and the 2nd metal mold 320 which formed the mold cavity 321 of the shape of the configuration of the fixed part 217 of a keytop 211 and isomorphism are prepared. Pinch the film board 201 with the 1st and the 2nd metal mold 300,320, and it is filled up with a melting resin from the pin gate 303 attached in

the portion which casts the flange section 215 of the mold cavity 301 of the 1st metal mold 300. It is filled up with a melting resin also in the mold cavity 321 of the 2nd metal mold 320 through the breakthrough 205 prepared in the film board 201 at the same time it is filled up with a melting resin in the mold cavity 301 of the 1st metal mold 300. And after a melting resin solidifies, the 1st and the 2nd metal mold 300,320 are removed.

[0007] Having attached the pin gate 303 in the portion which casts the flange section 215 of the mold cavity 301 of the 1st metal mold 300 here is based on the following reasons. That is, although the remains of the gate remain in the front face of the portion which connected the pin gate 303 of a keytop 211, if these remains of the gate are on the flange section 215, since this flange section 215 will be hidden in the case (not shown) attached on this keytop 211, it is for the remains of the gate not to appear at all in the portion exposed from the case of a keytop 211. In other words, one of the reasons which has formed the flange section 215 in the periphery of a keytop 211 is for hiding these remains of the gate.

[0008]

[Problem(s) to be Solved by the Invention] However, when the keytop of the above-mentioned structure was manufactured by the above-mentioned method, there were the following troubles.

** When the pin gate 303 was formed in the 1st metal mold 300 and it was filled up with the melting resin, as an arrow showed to drawing 9 , since it went upward after filling up with the melting resin injected from the pin gate 303 with vigor sufficient in the mold cavity 321 of the 2nd metal mold 320 through the breakthrough 205 of the direct film board 201, as a dotted line showed, it had turned over the undersurface of the film board 201, and had a possibility that normal molding might become impossible.

[0009] ** the width of face of the crevice which a mold cavity 301 and a pin gate 303 approach, and forms the part flange section 215 for this reason since a pin gate 303 is located on the crevice which has a certain amount of path and forms the flange section 215 if a pin gate 303 is formed in the 1st metal mold 300 side as shown in above-mentioned drawing 8 — large — not carrying out — it will not obtain but, so, the path of the whole keytop will become large

[0010] ** although the complicated mold cavity 301 of structure is formed in the 1st metal mold 300, structure is still more complicated if a pin gate 303 is formed in the 1st metal mold 300 — becoming — metal mold — a manufacturing cost will become high

[0011] ** The keytop board of the structure which pinches this film board by the fixed

part of the keytop cast to the rear-face side of a film board through the mould resin cast on the upper surface of a film board and the breakthrough prepared in the film board is in the keytop board of the structure where the flange section is not prepared in time. As shown in drawing 10 , such a keytop board of structure forms the mold cavity 401 of the configuration of the upper part of a keytop in the 1st metal mold 400, forms the mold cavity 501 of the configuration of a fixed part in the 2nd metal mold 500, and is cast by pressing a melting resin fit from the pin gate 503 linked to the mold cavity 501. However, also in this manufacture method, at the time of pressing [of a melting resin] fit, in this drawing, this melting resin had been turned over upward in the portion around [breakthrough 601] the film board 600, as a dotted line showed, and there was a trouble of normal molding becoming impossible.

[0012] this invention is made in view of an above-mentioned point, and, as for the purpose, the film board has been turned over — there is nothing — moreover, metal mold — it is in offering the manufacture method of a keytop board that structure becomes easy

[0013]

[Means for Solving the Problem] In the manufacture method of the keytop board which comes to fabricate the keytop to which this invention becomes the upper surface of the film board which consists of a resin film which has flexibility from a mould resin in order to solve the above-mentioned trouble The 1st metal mold which has the mold cavity of the shape of the configuration of the upper part of the aforementioned keytop, and isomorphism, The film board which prepared the breakthrough in the predetermined position which counters the mold cavity of this 1st metal mold, By preparing the 2nd metal mold which prepared the pin gate which projects toward the inside of the mold cavity of the 1st metal mold of the above in the position which counters the breakthrough of this film board, and pinching the aforementioned film board between the 1st metal mold and the 2nd metal mold You penetrate the pin gate prepared in the 2nd metal mold to the breakthrough of a film board, and make it rush in into the mold cavity of the 1st metal mold. After pouring in the melting resin into the mold cavity prepared in the 1st metal mold from this pin gate, filling the inside of this mold cavity with the melting resin and this melting resin's solidifying, we decided to fabricate a keytop on a film board by removing the 1st metal mold and the 2nd metal mold.

[0014]

[Function] Since the pin gate has rushed in into the mold cavity of the 1st metal mold, once the melting resin injected from this pin gate collides with the mold cavity inside

of the 1st metal mold, it flows so that a film board may be pushed against the 2nd metal mold. Therefore, a melting resin can be filled up with the state where the film board of the pin-gate circumference had not been turned over from the 2nd metal mold, and it stuck to the 2nd carat draw spike certainly.

[0015]

[Example] Hereafter, the example of this invention is explained in detail based on a drawing. Drawing 1 is drawing showing the important section of the keytop board 10 concerning one example of this invention, and, for this drawing (a), a plan and this drawing (b) are [the A-A cross section of this drawing (a) and this drawing (d) of a side elevation and this drawing (c)] rear-face views.

[0016] As shown in this drawing, this keytop board 10 fabricates a keytop 30 on the upper surface of the film board 20, and is constituted. In addition, the flange section 31 is formed in the periphery of this keytop 30, and with the fixed part 33 prepared in the rear-face side of the film board 20 through the breakthrough 25 prepared in the film board 20, this flange section 31 pinches the film board 20, and is fixing this keytop 30 to the film board 20.

[0017] The film board 20 consists of a transparent resin film which has *****, for example, a polyethylene terephthalate, (PET), polycarbonate resin, etc., and the adhesives layer 23 (not shown in drawing 1) which consists of a printing layer 21 which consists of a denaturation urethane resin, and transparent vinyl chloride resin is printed by the upper surface, and it is constituted here. In addition, since the printing layer 21 and the adhesives layer 23 are thin, it is not shown in the cross section of drawing 1 (c) (refer to drawing 2 which carries out the following). And the breakthrough 27 for inserting the pin gate 55 (referring to drawing 2 (c)) of the 2nd metal mold 50 which three breakthroughs 25 for forming three fixed parts 33 of the aforementioned keytop 30 are formed in this film board 20, and carries out the following is formed.

[0018] On the other hand, a keytop 30 consists of a thermoplastic transparent material, for example, acrylic resin, polycarbonate resin, etc., and the crevice 35 formed of the pin gate 55 of the 2nd metal mold 50 which carries out the following is established in the portion which faces the breakthrough 27 of the aforementioned film board 20 of this keytop 30.

[0019] And the switch contact which is not illustrated just under this keytop 30 and the film board 20 is arranged, and if this keytop 30 is pressed, this switch contact will be turned on and off.

[0020] Moreover, if a light emitting device is arranged and the light is led to the

inferior-surface-of-tongue side of the film board 20 at a keytop 30, it will let the transparent film board 20 and a transparent keytop 30 pass, and the printing layers 21, such as a pattern that it was printed by the film board 20, will begin to be brightly compared with the front face of a keytop 30. Since the printing layer 21 can be formed on the field of the whole center-section part bottom except the flange section 31 of this keytop 30 since breakthroughs 25 and 27 are not formed in the film board 20 of right under for a center section except the flange section 31 of a keytop 30 at all at this time, and the chip of the printing layer 21 by the breakthrough does not arise into this portion, it is suitable on keytop 30 ornament.

[0021] Next, the manufacture method of this keytop board 10 is explained. Drawing 2 is drawing showing the manufacture method of the keytop board 10. As shown in drawing 2 (a), first, on the film board 20, the printing layer 21 which consists of desired character, number, pattern, etc. is printed, and the transparent adhesives layer 23 is printed on it.

[0022] Next, as shown in drawing 2 (b), a press punches three breakthroughs 25 and one breakthrough 27 at this film board 20. In addition, the position in which a breakthrough 25 is formed is a position in which the fixed part 33 of the aforementioned keytop 30 is formed, and the position in which a breakthrough 27 is formed cannot be overemphasized by that it is the position in which the crevice 35 of the aforementioned keytop 30 is established.

[0023] Next, as shown in drawing 2 (c), this film board 20 is pinched between the 1st and the 2nd metal mold 40 and 50.

[0024] The mold cavity 41 of the shape of the configuration of the upper part of the aforementioned keytop 30 and isomorphism is formed in the 1st metal mold 40 here.

[0025] Three mold cavities 51 of the shape of this fixed part 33 and isomorphism are formed in the position in which the fixed part 33 of the aforementioned keytop 30 of the 2nd metal mold 50 is formed on the other hand.

[0026] Moreover, the pin gate 55 of height which results in the mold cavity 41 of the 1st metal mold 40 of the above is formed in the position in which the crevice 35 of the aforementioned keytop 30 of this 2nd metal mold 50 is established.

[0027] When the film board 20 is pinched with the 1st and the 2nd metal mold 40 and 50, therefore, all the breakthroughs 25 and 27 of the film board 20 It is located in the portion in which all fabricate the flange section 31 of the mold cavity 41 of the 1st metal mold 40. Simultaneously, three breakthroughs 25 were located in the portion of three mold cavities 51 of the 2nd metal mold 50, and pin-gate 55 nose of cam further established in the 2nd metal mold 50 has rushed in into the mold cavity 41 of the 1st

metal mold 40, where the breakthrough 27 of the film board 20 is penetrated.

[0028] And while pressing fit the resin fused from the pin gate 55 prepared in the 2nd metal mold 50 in this state and filling the inside of the mold cavity 41 of the 1st metal mold 40 with this melting resin, a melting resin is filled also in the mold cavity 51 prepared in the 2nd metal mold 50 through three breakthroughs 25.

[0029] And if the 1st and the 2nd metal mold 40 and 50 are removed after this melting resin solidifies, the keytop board 10 shown in drawing 1 will be completed.

[0030] Drawing 3 is the important section expansion sectional side elevation showing the portion of the pin-gate 55 circumference when being filled up with the melting resin here. Since the pin gate 55 has rushed in into the mold cavity 41 of the 1st metal mold 40 in the case of this invention as shown in this drawing, once the melting resin injected from this pin gate 55 collides with mold cavity 41 inside of the 1st metal mold 40, it flows so that the film board 20 may be pushed against the 2nd metal mold 50. Therefore, a melting resin is filled up with the state where the film board 20 of the pin-gate 55 circumference entwines 50 the 2nd metal mold, and it had not been given, and stuck on the 2nd metal mold 50 certainly.

[0031] By the way, since it is fixed by pinching the film board 20 by the flange section 31 and the fixed part 33 and the keytop 30 concerning this example has pasted up this keytop 30 by the adhesives layer 23 (refer to drawing 2) further as shown in drawing 1 , it is sure. [the] In addition, in the case of this example, the adhesives layer 23 is not necessarily required. Moreover, it may ornament at adhesives layer 23 the very thing, a printing function may be made to have, and the printing layer 21 may be omitted. Conversely, as shown in drawing 4 which carries out the following, when using the adhesives layer 23, the flange section 31, a fixed part 33, and a breakthrough 25 are not necessarily required.

[0032] That is, like the keytop board 10-2 shown in drawing 4 , the flange section may not be prepared in the periphery of a keytop 30-2, but only one tongue-shaped piece 29 may be formed, only one breakthrough 27 may be formed in the position which, on the other hand, counters the film board 20-2 at this tongue-shaped piece 29, and only the adhesives layer 23 (refer to drawing 2) which printed fixation to the film board 20-2 of a keytop 30-2 on the film board 20-2 may perform

[0033] Thus, if constituted, since the flange section 31 and the fixed part 33 are unnecessary, the miniaturization of a keytop 30-2 can be attained.

[0034] Moreover, when applying this invention to the keytop board of the structure where the flange section or a tongue-shaped piece is not prepared The 1st metal mold 60 which has the mold cavity 61 of the shape of the configuration of the upper

part of a keytop, and isomorphism without the flange section as shown in drawing 5 , The 2nd metal mold 70 which formed the mold cavity 71 of the shape of the center, the film board 65 which formed breakthroughs 67 and 68 in the surrounding predetermined position, respectively, the configuration of a fixed part prepared in the inferior surface of tongue of a keytop, and isomorphism is prepared, and the film board 65 is pinched between the 1st and the 2nd metal mold 60 and 70. In addition, the adhesives layer 69 is printed on the film board 65.

[0035] The pin gate 63 of height which results in the mold cavity 61 of the 1st metal mold 60 of the above is formed in the position of the breakthrough 67 of the center of the aforementioned film board 65 of the 2nd metal mold 70 here. Therefore, when the film board 65 is pinched with the 1st and the 2nd metal mold 60 and 70, pin-gate 63 nose of cam rushes in into the mold cavity 61 of the 1st metal mold 60, where the breakthrough 67 of the center of the film board 65 is penetrated.

[0036] And while pressing fit the resin fused from the pin gate 63 in this state and filling the inside of the mold cavity 61 of the 1st metal mold 60 with this melting resin, a keytop is cast by filling a melting resin also in the mold cavity 71 prepared in the 2nd metal mold 70 through the surrounding breakthrough 68.

[0037] Thus, a melting resin will be filled up with the state where the film board 65 of the pin-gate 63 circumference entwines 70 the 2nd metal mold like the above-mentioned example, and it had not been given, and stuck on the 2nd metal mold 70 certainly if it manufactures.

[0038] Moreover, when applying this invention to the keytop board of the structure where the flange section and a fixed part are not prepared The 1st metal mold 60 which has the mold cavity 61 of the shape of the configuration of the upper part of a keytop, and isomorphism without the flange section as shown in drawing 6 , The 2nd metal mold 70 which formed the pin gate 63 of height which results in the mold cavity 61 of the 1st metal mold 60 in the position of the breakthrough 67 of the center of the film board 65 which formed the breakthrough 67 in the center, and the film board 65 is prepared, and the film board 65 is pinched between the 1st and the 2nd metal mold 60 and 70. In addition, the adhesives layer 69 is printed in the film board 65 upper surface.

[0039] And a keytop is cast by pressing fit the resin fused from pin-gate 63 nose of cam which penetrated the breakthrough 67 of the center of the film board 65, and filling the inside of the mold cavity 61 of the 1st metal mold 60 with this melting resin.

[0040] A melting resin is filled up with the state where the film board 65 of the pin-gate 63 circumference entwines 70 the 2nd metal mold in this example as well as the above-mentioned example, it had not been given, and it stuck on the 2nd metal

mold 70 certainly.

[0041] If it carries out like this example and a keytop is cast, in spite of being the keytop of structure which does not prepare the flange section and a fixed part, it is not necessary to prepare a pin gate in the mold cavity 61 side of the 1st metal mold 60, therefore the marks of a pin gate do not appear in a keytop front face.

[0042] Although the example of this invention was explained in detail above, it cannot be overemphasized that this invention is not limited to these but it can apply to the keytop board of other various structures. In short, if it is the keytop board which comes to fabricate the keytop which consists of a mould resin, it is applicable to the upper surface of a film board at the thing of any structures.

[0043]

[Effect of the Invention] As explained to the detail above, according to this invention, it has the following outstanding effects.

** Since a melting resin is poured in into the mold cavity which penetrated the pin gate prepared in the 2nd metal mold to the breakthrough of a film board, rushed in into the mold cavity of the 1st metal mold, and was prepared in the 1st metal mold from this pin gate, the film board of the 2nd carat draw spike has not been turned over from the 2nd metal mold, and normal molding can be ensured.

[0044] ** Since the pin gate was prepared in the 2nd metal mold when the keytop of structure which prepared a tongue-shaped piece or the flange section was cast, opening of a pin gate can be prepared near [in which the flange section or the tongue-shaped piece of a mold cavity of the 1st metal mold is prepared easily] the partial beginning solution, and the miniaturization of the flange section or a tongue-shaped piece can be attained by this.

[0045] ** since it is not necessary to prepare a pin gate in the 1st metal mold which has the complicated mold cavity of structure and a pin gate can be prepared in the 2nd easy metal mold of structure — as a whole — metal mold — reduction-ization of a manufacturing cost can be attained

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing showing the important section of the keytop board 10 concerning one example of this invention, and, for this drawing (a), a plan and this drawing (b) are [the A-A cross section of this drawing (a) and this drawing (d) of a

side elevation and this drawing (c)] rear-face views.

[Drawing 2] Drawing 2 (a), (b), and (c) are drawings showing the manufacture method of the keytop board 10.

[Drawing 3] It is the important section expansion sectional side elevation showing the portion of the pin-gate 55 circumference when being filled up with the melting resin.

[Drawing 4] It is drawing showing the keytop board 10-2 concerning other examples of this invention, and, for this drawing (a), a plan and this drawing (b) are [the C-C cross section of this drawing (a) and this drawing (d) of a side elevation and this drawing (c)] rear-face views.

[Drawing 5] It is drawing showing the manufacture method of the keytop board concerning other examples of this invention.

[Drawing 6] It is drawing showing the manufacture method of the keytop board concerning other examples of this invention.

[Drawing 7] It is the important section outline sectional side elevation showing the portion of the keytop 211 of the conventional keytop board 200.

[Drawing 8] It is the important section outline sectional side elevation showing how to manufacture the keytop board 200.

[Drawing 9] It is the important section expansion sectional side elevation showing the portion of the pin-gate 303 circumference when being filled up with the melting resin.

[Drawing 10] It is the important section outline sectional side elevation showing how to manufacture other conventional keytop boards.

[Description of Notations]

10 Keytop Board
20 20-2 Film board
27 Breakthrough
29 Tongue-shaped Piece
30 30-2 Keytop
31 Flange Section
35 Crevice
40 1st Metal Mold
41 Mold Cavity
50 2nd Metal Mold
55 Pin Gate

[Translation done.]

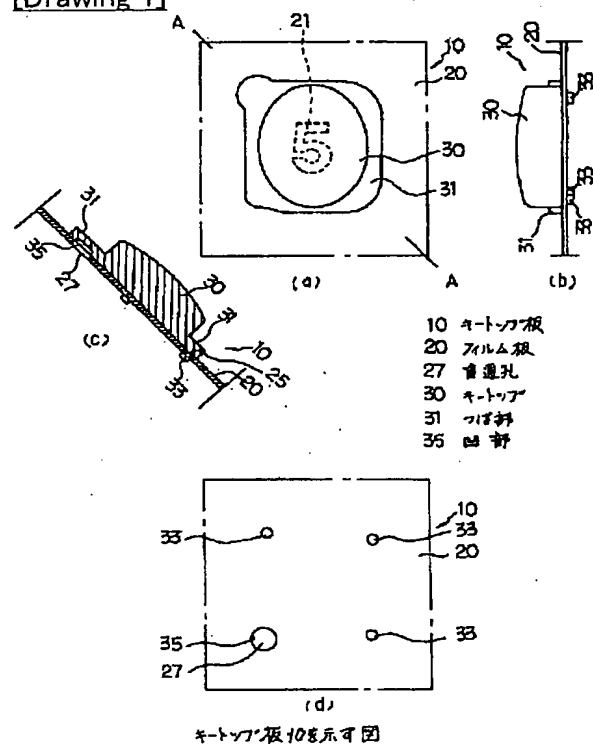
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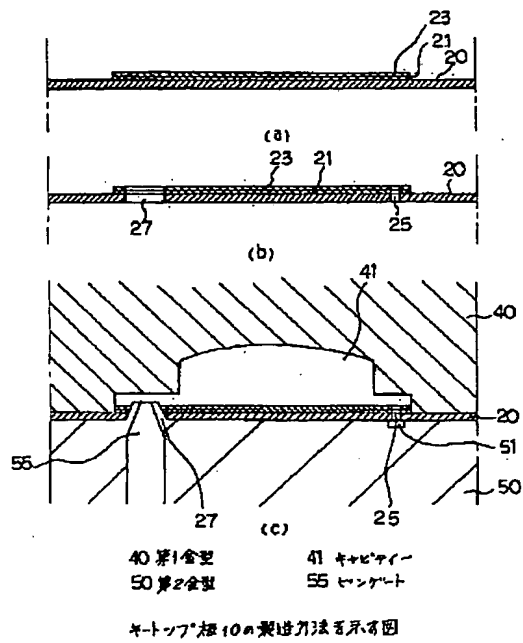
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DRAWINGS

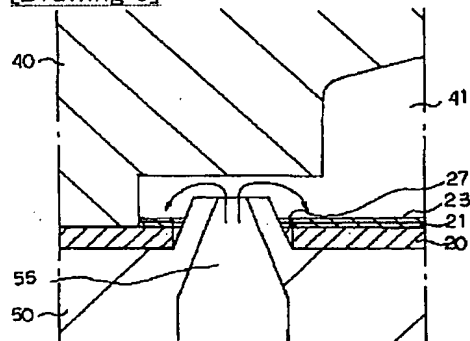
[Drawing 1]



[Drawing 2]

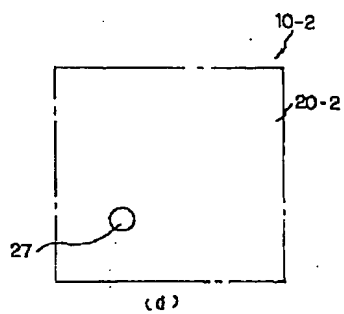
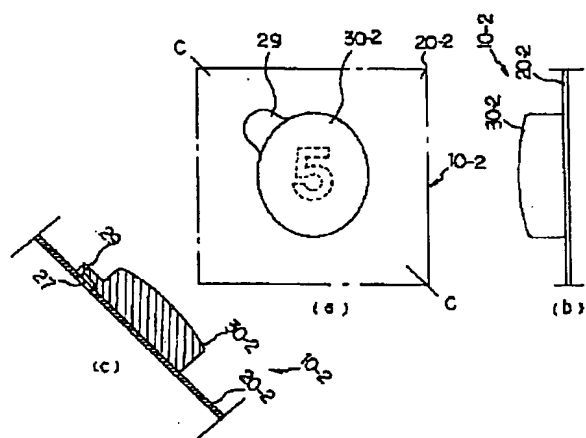


[Drawing 3]



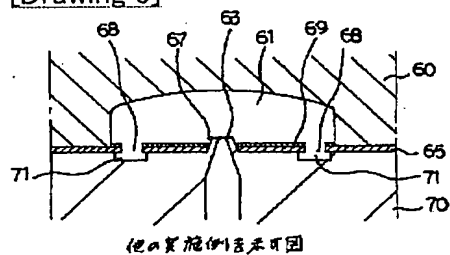
ピンゲート' 部10の部分を示す図

[Drawing 4]



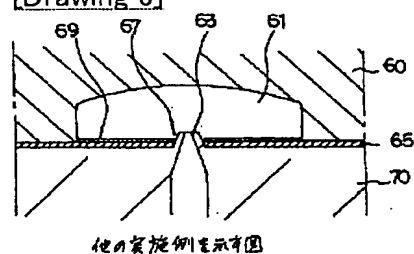
キートン板 10-2 を示す図

[Drawing 5]



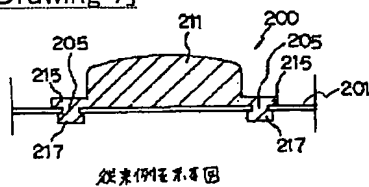
他の実施例を示す図

[Drawing 6]



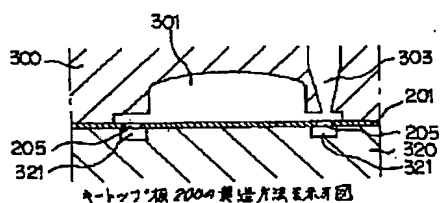
他の実施例を示す図

[Drawing 7]

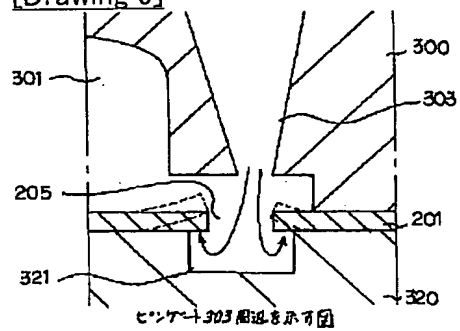


従来例を示す図

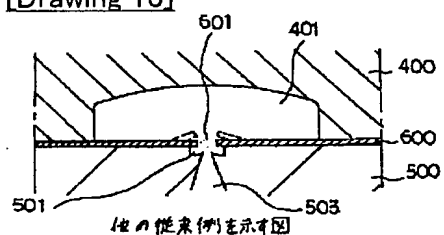
[Drawing 8]



[Drawing 9]



[Drawing 10]



[Translation done.]

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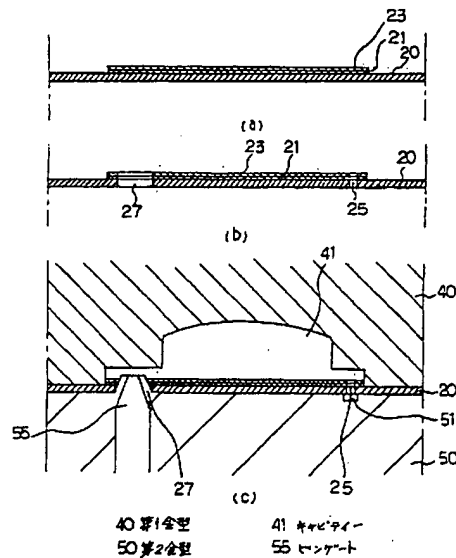
弁理士 熊谷 隆 (外1名)

(54) 【発明の名称】 キートップ板の製造方法

(57) 【要約】

【目的】 フィルム板がめくれ上がることがなく、また金型構造が簡単になるキートップ板の製造方法を提供すること。

【構成】 フィルム板20の上面にモールド樹脂からなるキートップを成形してなるキートップ板の製造方法である。キートップの上部の形状と同形状のキャビティー41を有する第1金型40と、キャビティー41に対向する所定位置に貫通孔27を設けたフィルム板20と、貫通孔27に対向する位置にキャビティー41内に向かって突出するピンゲート55を設けた第2金型50とを用意する。フィルム板20を第1、第2金型40、50で挟持し、ピンゲート55を貫通孔27に貫通して第1金型40のキャビティー41内に突入し、ピンゲート55から該キャビティー41内に溶融樹脂を注入する。溶融樹脂が固化した後第1、第2金型40、50を取り外す。



キートップ板10の製造方法を示す図

【特許請求の範囲】

【請求項1】 可撓性を有する樹脂フィルムからなるフィルム板の上面に、モールド樹脂からなるキートップを成形してなるキートップ板の製造方法において、

前記キートップの上部の形状と同形状のキャビティを有する第1金型と、該第1金型のキャビティに対向する所定位置に貫通孔を設けたフィルム板と、該フィルム板の貫通孔に対向する位置に前記第1金型のキャビティ内に向かって突出するピンゲートを設けた第2金型とを用意し、

前記フィルム板を第1金型と第2金型の間に挟持することによって、第2金型に設けたピンゲートをフィルム板の貫通孔に貫通して第1金型のキャビティ内に突入せしめ、該ピンゲートから第1金型に設けたキャビティ内に溶融樹脂を注入して該キャビティ内を溶融樹脂で満たし、該溶融樹脂が固化した後に第1金型と第2金型を取り外すことによって、フィルム板上にキートップを成形することを特徴とするキートップ板の製造方法。

【請求項2】 可撓性を有する樹脂フィルムからなるフィルム板の上面に、モールド樹脂からなりその外周に樹脂注入用の舌片又はつば部を突出せしめた形状のキートップを成形してなるキートップ板の製造方法において、前記キートップの上部の形状と同形状のキャビティを有する第1金型と、該第1金型のキャビティの舌片又はつば部を成型する部分に対向する所定位置に貫通孔を設けたフィルム板と、該フィルム板の貫通孔に対向する位置に前記第1金型のキャビティ内に向かって突出するピンゲートを設けた第2金型とを用意し、

前記フィルム板を第1金型と第2金型の間に挟持することによって、第2金型に設けたピンゲートをフィルム板の貫通孔に貫通して第1金型のキャビティの舌片又はつば部を成型する部分内に突入せしめ、該ピンゲートから第1金型に設けたキャビティ内に溶融樹脂を注入して該キャビティ内を溶融樹脂で満たし、該溶融樹脂が固化した後に第1金型と第2金型を取り外すことによって、フィルム板上にキートップを成形することを特徴とするキートップ板の製造方法。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は、押釦スイッチに用いるキートップ板の製造方法に関するものである。

【0002】

【従来技術】 従来、小型化・薄型化を図るために樹脂フィルムからなるフィルム板上に直接モールド樹脂製のキートップを成型したキートップ板が開発されており、その中でもフィルム板に所望の印刷層を印刷しておき、これをその下側に配置した照明手段によって照らし出すタイプのキートップ板が開発されている。

【0003】 図7はこの種の従来のキートップ板のキートップの部分を示す要部概略側断面図である。同図に示

すようにこのキートップ板200は、透明であってその上面に所望の印刷層を印刷した樹脂製のフィルム板201の上に、透明なモールド樹脂製のキートップ211を直接成型して構成されている。

【0004】 フィルム板201とキートップ211間の固定は、キートップ211の外周に設けたつば部215と、フィルム板201に設けた貫通孔205を通してつば部215からフィルム板201の裏面側に到る固定部217とによってフィルム板201を挟持することによって行われる。

【0005】 そして図示しない照明手段によってこのキートップ板200をその下側から照らし出せば、フィルム板201上に印刷した色彩・模様などがキートップ211の表面にくっきりと照らし出される。特にこのキートップ211の場合、キートップ211のつば部215を除く真下の部分全体に、貫通孔205や固定部217が位置しないので、該部分全体に印刷した色彩・模様などが何ものにも妨げられずに表示できるので好適である。

【0006】 図8はこの種のキートップ板200を製造する方法を示す要部概略側断面図である。同図に示すようにこのキートップ板200を製造するには、キートップ211の上部の形状と同形状のキャビティ301を有する第1金型300と、その所定位置に複数の貫通孔205を設けたフィルム板201と、キートップ211の固定部217の形状と同形状のキャビティ321を設けた第2金型320とを用意し、フィルム板201を第1、第2金型300、320で挟持し、第1金型300のキャビティ301のつば部215を成型する部分に取り付けたピンゲート303から溶融樹脂を充填し、第1金型300のキャビティ301内に溶融樹脂を充填すると同時にフィルム板201に設けた貫通孔205を通して第2金型320のキャビティ321内にも溶融樹脂を充填する。そして溶融樹脂が固化した後に第1、第2金型300、320を取り外す。

【0007】 ここで第1金型300のキャビティ301のつば部215を成型する部分にピンゲート303を取り付けたのは以下の理由による。即ち、キートップ211のピンゲート303を接続した部分の表面にはゲート跡が残るが、このゲート跡がつば部215上にあれば、このつば部215はこのキートップ211の上に取付けられるケース（図示せず）に隠されるので、キートップ211のケースから露出する部分には何らゲート跡が現われないためである。言い替えればキートップ211の外周につば部215を設けている理由の1つはこのゲート跡を隠すためである。

【0008】

【発明が解決しようとする課題】 しかしながら上記構造のキートップを上記方法で製造した場合、以下のような問題点があった。

①第1金型300にピンゲート303を設けて溶融樹脂を充填すると、図9に矢印で示すように、ピンゲート303から射出された溶融樹脂は直接フィルム板201の貫通孔205を通して第2金型320のキャビティー321内に勢い良く充填された後に上方向に向かうため、フィルム板201の下面を点線で示すようにめくり上げてしまい、正常な成型ができなくなってしまう恐れがあった。

【0009】②上記図8に示すように、ピンゲート303を第1金型300側に設けると、ピンゲート303はある程度の径を有してつば部215を形成する凹部に位置するため、キャビティー301とピンゲート303が接近してしまい、このためそのつば部215を形成する凹部の幅を大きくせざるを得ず、それゆえキートップ全体の径が大きくなってしまう。

【0010】③第1金型300には構造の複雑なキャビティー301が設けられているが、その第1金型300にピンゲート303を設けると、さらに構造が複雑となって金型製造コストが高くなってしまう。

【0011】④ところでつば部を設けない構造のキートップ板の中には、フィルム板の上面に成型したモールド樹脂と、フィルム板に設けた貫通孔を介してフィルム板の裏面に成型したキートップの固定部によって該フィルム板を挟持する構造のキートップ板がある。このような構造のキートップ板は、図10に示すように、第1金型400にキートップの上部の形状のキャビティー401を設け、第2金型500に固定部の形状のキャビティー501を設け、キャビティー501に接続したピンゲート503から溶融樹脂を圧入することによって成型される。しかしながらこの製造方法においても、溶融樹脂の圧入時に該溶融樹脂が同図に点線で示すようにフィルム板600の貫通孔601周囲の部分を上方向にめくり上げてしまい、正常な成型ができなくなってしまうという問題点があった。

【0012】本発明は上述の点に鑑みてなされたものでありその目的は、フィルム板がめくれ上がるのがなく、また金型構造が簡単になるキートップ板の製造方法を提供することにある。

【0013】

【課題を解決するための手段】上記問題点を解決するため本発明は、可換性を有する樹脂フィルムからなるフィルム板の上面に、モールド樹脂からなるキートップを成形してなるキートップ板の製造方法において、前記キートップの上部の形状と同形状のキャビティーを有する第1金型と、該第1金型のキャビティーに対向する所定位置に貫通孔を設けたフィルム板と、該フィルム板の貫通孔に対向する位置に前記第1金型のキャビティー内に向かって突出するピンゲートを設けた第2金型とを用意し、前記フィルム板を第1金型と第2金型の間に挟持することによって、第2金型に設けたピンゲートをフィルム

ム板の貫通孔に貫通して第1金型のキャビティー内に突入せしめ、該ピンゲートから第1金型に設けたキャビティー内に溶融樹脂を注入して該キャビティー内を溶融樹脂で満たし、該溶融樹脂が固化した後に第1金型と第2金型を取り外すことによって、フィルム板上にキートップを成形することとした。

【0014】

【作用】ピンゲートが第1金型のキャビティー内に突入しているため、該ピンゲートから射出された溶融樹脂は、一旦第1金型のキャビティー内面に衝突した後、フィルム板を第2金型に押し付けるように流れていく。従ってピンゲート周辺のフィルム板が第2金型からめくれ上がることはなく、確実に第2金型上に密着した状態で溶融樹脂を充填できる。

【0015】

【実施例】以下、本発明の実施例を図面に基づいて詳細に説明する。図1は本発明の1実施例にかかるキートップ板10の要部を示す図であり、同図(a)は平面図、同図(b)は側面図、同図(c)は同図(a)のA-A断面図、同図(d)は裏面図である。

【0016】同図に示すようにこのキートップ板10は、フィルム板20の上面にキートップ30を成形して構成されている。なおこのキートップ30の外周にはつば部31が設けられており、該つば部31はフィルム板20に設けた貫通孔25を介してフィルム板20の裏面に設けた固定部33とともにフィルム板20を挟持してこのキートップ30をフィルム板20に固定している。

【0017】ここでフィルム板20は可換製を有する透明な樹脂フィルム、例えばポリエチレンテレフタレート(PET)、ポリカーボネート樹脂等からなり、その上面には変性ウレタン樹脂からなる印刷層21と透明な塩化ビニル樹脂からなる接着剤層23(図1には示さず)が印刷されて構成されている。なお印刷層21と接着剤層23は薄いため、図1(c)の断面図には示していない(下記する図2参照)。そしてこのフィルム板20には前記キートップ30の3つの固定部33を設けるための3つの貫通孔25が設けられており、また下記する第2金型50のピンゲート55(図2(c)参照)を挿入するための貫通孔27が設けられている。

【0018】一方キートップ30は熱可塑性の透明な材料、例えばアクリル樹脂、ポリカーボネート樹脂等からなり、該キートップ30の前記フィルム板20の貫通孔27に面する部分には、下記する第2金型50のピンゲート55によって形成される凹部35が設けられている。

【0019】そしてこのキートップ30とフィルム板20の真下に図示しないスイッチ接点を配置して、該キートップ30を押圧すれば該スイッチ接点がオンオフする。

【0020】またフィルム板20の下面側に発光素子を配置してその光をキートップ30に導けば、透明なフィルム板20とキートップ30を通して、フィルム板20に印刷された模様などの印刷層21がキートップ30の表面に明るく照らし出される。このときキートップ30のつば部31を除く中央部分の真下のフィルム板20には何ら貫通孔25、27が設けられていないので、該キートップ30のつば部31を除く中央部分全体の下の側の面上に印刷層21を設けることができ、該部分に貫通孔による印刷層21の欠けが生じないので、キートップ30 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295 300 305 310 315 320 325 330 335 340 345 350 355 360 365 370 375 380 385 390 395 400 405 410 415 420 425 430 435 440 445 450 455 460 465 470 475 480 485 490 495 500 505 510 515 520 525 530 535 540 545 550 555 560 565 570 575 580 585 590 595 600 605 610 615 620 625 630 635 640 645 650 655 660 665 670 675 680 685 690 695 700 705 710 715 720 725 730 735 740 745 750 755 760 765 770 775 780 785 790 795 800 805 810 815 820 825 830 835 840 845 850 855 860 865 870 875 880 885 890 895 900 905 910 915 920 925 930 935 940 945 950 955 960 965 970 975 980 985 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7990 7995 8000 8005 8010 8015 8020 8025 8030 8035 8040 8045 8050 8055 8060 8065 8070 8075 8080 8085 8090 8095 8100 8105 8110 8115 8120 8125 8130 8135 8140 8145 8150 8155 8160 8165 8170 8175 8180 8185 8190 8195 8200 8205 8210 8215 8220 8225 8230 8235 8240 8245 8250 8255 8260 8265 8270 8275 8280 8285 8290 8295 8300 8305 8310 8315 8320 8325 8330 8335 8340 8345 8350 8355 8360 8365 8370 8375 8380 8385 8390 8395 8400 8405 8410 8415 8420 8425 8430 8435 8440 8445 8450 8455 8460 8465 8470 8475 8480 8485 8490 8495 8500 8505 8510 8515 8520 8525 8530 8535 8540 8545 8550 8555 8560 8565 8570 8575 8580 8585 8590 8595 8600 8605 8610 8615 8620 8625 8630 8635 8640 8645 8650 8655 8660 8665 8670 8675 8680 8685 8690 8695 8700 8705 8710 8715 8720 8725 8730 8735 8740 8745 8750 8755 8760 8765 8770 8775 8780 8785 8790 8795 8800 8805 8810 8815 8820 8825 8830 8835 8840 8845 8850 8855 8860 8865 8870 8875 8880 8885 8890 8895 8900 8905 8910 8915 8920 8925 8930 8935 8940 8945 8950 8955 8960 8965 8970 8975 8980 8985 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11655 11660 11665 11670 11675 11680 11685 11690 11695 11700 11705 11710 11715 11720 11725 11730 11735 11740 11745 11750 11755 11760 11765 11770 11775 11780 11785 11790 11795 11800 11805 11810 11815 11820 11825 11830 11835 11840 11845 11850 11855 11860 11865 11870 11875 11880 11885 11890 11895 11900 11905 11910 11915 11920 11925 11930 1193

した樹脂を圧入して第1金型60のキャビティ61内を該溶解樹脂で満たすと共に、周囲の貫通孔68を通して第2金型70に設けたキャビティ71内にも溶解樹脂を満たすことによってキートップを成型する。

【0037】このようにして製造すれば、上記実施例と同様にピンゲート63周辺のフィルム板65が第2金型70からめくれ上がることはなく、確実に第2金型70上に密着した状態で溶解樹脂が充填される。

【0038】また本発明をつば部と固定部を設けない構造のキートップ板に应用する場合は、図6に示すように、つば部のないキートップの上部の形状と同形状のキャビティ61を有する第1金型60と、その中央に貫通孔67を設けたフィルム板65と、フィルム板65の中央の貫通孔67の位置に第1金型60のキャビティ61内に到る高さのピンゲート63を設けた第2金型70とを用い、フィルム板65を第1、第2金型60、70の間に挟持する。なおフィルム板65上面には接着剤層69を印刷しておく。

【0039】そしてフィルム板65の中央の貫通孔67を貫通したピンゲート63先端から溶解した樹脂を圧入して第1金型60のキャビティ61内を該溶解樹脂で満たすことによってキートップを成型する。

【0040】この実施例の場合も、上記実施例と同様にピンゲート63周辺のフィルム板65が第2金型70からめくれ上がることはなく、確実に第2金型70上に密着した状態で溶解樹脂が充填される。

【0041】この実施例のようにしてキートップを成型すれば、つば部と固定部を設けない構造のキートップであるにもかかわらず、ピンゲートを第1金型60のキャビティ61側に設けなくてもよく、従ってピンゲートの跡がキートップ表面に現われない。

【0042】以上本発明の実施例を詳細に説明したが、本発明はこれらに限定されず、他の種々の構造のキートップ板に適用できることは言うまでもない。要はフィルム板の上面に、モールド樹脂からなるキートップを成形してなるキートップ板であれば、どのような構造のものにも適用できるのである。

【0043】

【発明の効果】以上詳細に説明したように、本発明によれば、以下のような優れた効果を有する。

①第2金型に設けたピンゲートをフィルム板の貫通孔に貫通して第1金型のキャビティ内に突入し、該ピンゲートから第1金型に設けたキャビティ内に溶解樹脂を注入することとしたので、第2金型上のフィルム板が第2金型からめくれ上がることはなく、正常な成型が確実に行える。

【0044】②舌片又はつば部を設けた構造のキートッ

プを成型する場合、ピンゲートを第2金型に設けたので、ピンゲートの開口を容易に第1金型のキャビティのつば部又は舌片を設ける部分のつけ根近傍に設けることができ、これによってつば部又は舌片の小型化が図れる。

【0045】③構造の複雑なキャビティを有する第1金型にピンゲートを設ける必要はなく、構造の簡単な第2金型にピンゲートを設けることができるので、全体として金型製造コストの低減化が図れる。

【図面の簡単な説明】

【図1】本発明の1実施例にかかるキートップ板10の要部を示す図であり、同図(a)は平面図、同図(b)は側面図、同図(c)は同図(a)のA-A断面図、同図(d)は裏面図である。

【図2】図2(a)、(b)、(c)はキートップ板10の製造方法を示す図である。

【図3】溶解樹脂を充填しているときのピンゲート55周辺の部分を示す要部拡大側断面図である。

【図4】本発明の他の実施例にかかるキートップ板10-2を示す図であり、同図(a)は平面図、同図(b)は側面図、同図(c)は同図(a)のC-C断面図、同図(d)は裏面図である。

【図5】本発明の他の実施例にかかるキートップ板の製造方法を示す図である。

【図6】本発明の他の実施例にかかるキートップ板の製造方法を示す図である。

【図7】従来のキートップ板200のキートップ211の部分を示す要部概略側断面図である。

【図8】キートップ板200を製造する方法を示す要部概略側断面図である。

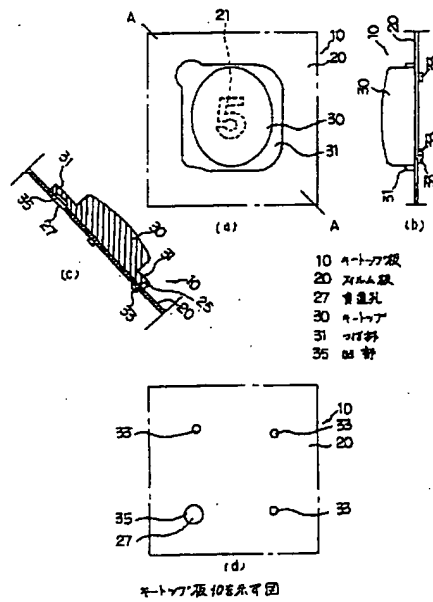
【図9】溶解樹脂を充填しているときのピンゲート303周辺の部分を示す要部拡大側断面図である。

【図10】従来の他のキートップ板を製造する方法を示す要部概略側断面図である。

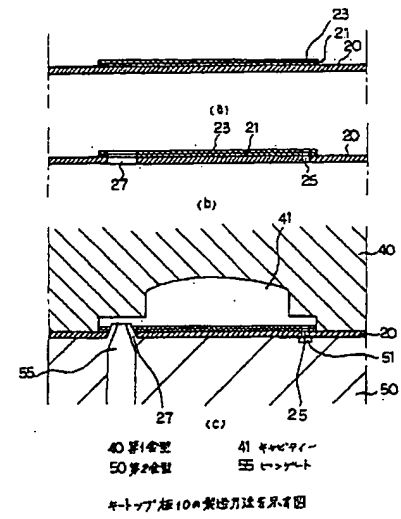
【符号の説明】

- 10 キートップ板
- 20, 20-2 フィilm板
- 27 貫通孔
- 29 舌片
- 30, 30-2 キートップ
- 31 つば部
- 35 凹部
- 40 第1金型
- 41 キャビティ
- 50 第2金型
- 55 ピンゲート

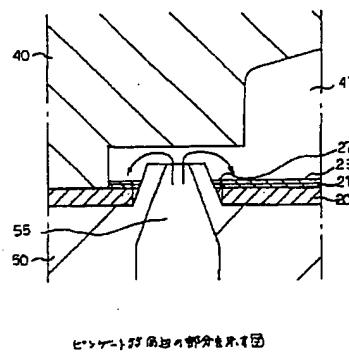
【図1】



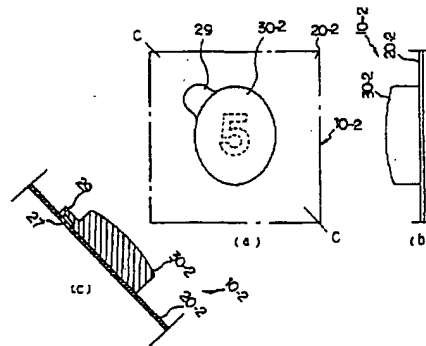
【図2】



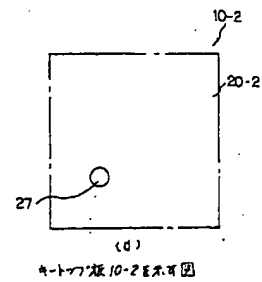
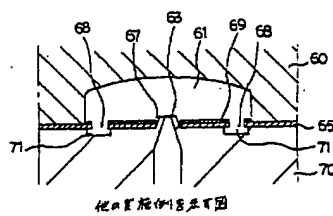
【図3】



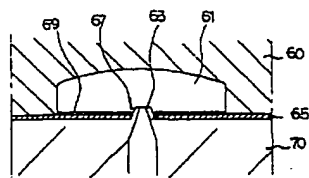
【図4】



【図5】

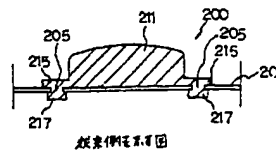


【図6】



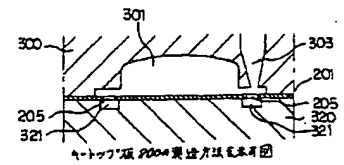
他の実施例を示す図

【図7】



従来の実施例を示す図

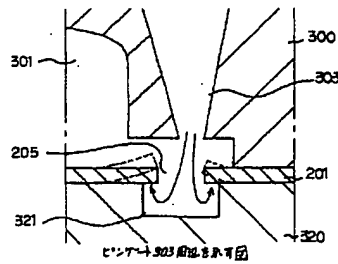
【図8】



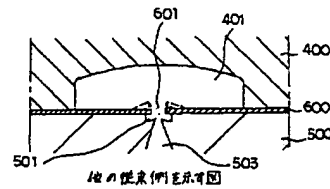
本発明の実施例を示す図

【図10】

【図9】



本発明の実施例を示す図



他の実施例を示す図